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The Right Ascensions of certain Stars within Ten Degrees of the Pole. Reduced from Observations by F. G. W. Struve.

By Henry Lefavour.

(*Communicated by Prof. T. H. Safford.*)

The observations from which the following star-places have been determined were made by Struve, at Dorpat in 1818 and 1819, and are published in the second volume of his "Dorpat Observations." The list includes all the stars that he observed which lie within ten degrees of the pole, with the exception of *Polaris*, the observations of which have already been reduced, and the stars which he designated as *Anonyma*, most of which are unimportant, and were observed but once, or at the most two or three times. The Right Ascensions are reduced to 1820·0, but no proper motions have been applied, and the epoch is consequently given for each star.

Catalogue of Mean Right Ascensions for 1820·0.

No.	Struve's Name.	Gr. No.	Misc. Cat. and No.	No. of Obs.	Mean Right Ascension for 1820·0. h	m	s	Epoch.
1	Cephei 320	67	...	3	0	19	46·097	1818·9
2	Ursæ Minoris 1	144	Bradley 65	9	0	39	10·712	1819·6
3	*a* Cephei 321	177	...	1	0	45	53·920	1818·9
4	Cephei 322	195	Bradley 95	1	0	48	21·260	1818·9
6	Rangiferi 15	424	...	3	1	47	55·007	1818·8
7	Rangiferi 16	426	...	2	1	48	33·430	1818·8
8	Rangiferi 21	506	...	1	2	12	33·640	1818·8
9	Rangiferi 23	527	...	2	2	22	35·215	1818·8
10	Rangiferi 26	580	Bradley 396	3	2	44	34·127	1818·9
11	Rangiferi 29	595	Bradley 402	2	2	51	33·490	1818·8
12	Rangiferi 323	642	...	4	3	8	58·663	1818·9

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No.	Struve's Name.	Gr. No.	Misc. Cat. and No.	No. of Obs.	Mean Right Ascension for 1820·0. h	m	s	Epoch.
13	Rangiferi 43	779	...	1	3	56	15·090	1818 9
14	Camelopardalis 36	856	Cephei 50 H.	1	4	37	7·100	1818·9
15	Camelopardalis 64	944	...	1	5	5	21·020	1819·5
16	Ursæ Minoris 4	1119	...	3	6	15	36·070	1819·1
17	Camelopardalis 120	1141	Cephei 51 H.	48	6	13	6·274	1818 9
18	Camelopardalis 131	1255	...	7	6	50	46·230	1818·8
19	Camelopardalis 132	1259	Camelopardalis 25 H.	3	6	52	38 480	1818·8
20	Camelopardalis 136	1278	...	6	7	1	24 485	1818·8
21	Camelopardalis 150	1339	Camelopardalis 28 H.	6	7	26	1·997	1818·8
22	Camelopardalis 152	1355	...	2	7	29	49·080	1818 8
23	Camelopardalis 156	1359	...	4	7	32	25·645	1818·8
24	Camelopardalis 170	1391	...	4	7	48	43·455	1818·8
25	Camelopardalis 180	1431	...	5	8	12	49·256	1818·8
26	Camelopardalis 182	1452	...	1	8	23	59·970	1818 9
27	Camelopardalis 183	1463	...	4	8	28	25·360	1818·9
28	Camelopardalis 184	1480	...	1	8	42	35·630	1818·9
29	Camelopardalis 186	1537	Draconis 1 H.	16	9	10	32·386	1818·9
30	Camelopardalis 189	1620	Camelopardalis 29 H.	4	10	1	44·428	1818·9
31	Camelopardalis 190	1633	Camelopardalis 30 H.	1	10	8	7·080	1818·9
32	Camelopardalis 191	1643	Bradley 1439	4	10	16	50 040	1818 9

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No.	Struve's Name.	Gr. No.	Misc. Cat. and No.	No. of Obs.	Mean Right Ascension for 1820·0. h	m	s	Epoch.
33	Camelopardalis 201	1778	...	2	11	16	46·300	1818·9
34	Camelopardalis 202	1782	...	3	11	18	42·923	1818·8
35	Camelopardalis 204	1845	...	2	11	50	39·380	1818·9
36	Camelopardalis 205	1850	...	3	11	55	27·077	1818·8
37	Camelopardalis 207 (pr.)	1858	Bradley 3241	4	12	2	41·960	1819·0
37 *a*	Camelopardalis 207 (sq.)	—	...	4	12	3	14·118	1819·0
38	Ursæ Minoris 5	1871	Bradley 1656	11	12	11	27·935	1818·9
39	Ursæ Minoris 6	1884	Bradley 1672	14	12	14	37·410	1818·9
40	Camelopardalis 209	1889	...	2	12	16	48·040	1818·9
42	Camelopardalis 211	1927	...	1	12	39	41·960	1818·9
43	*o* Camelopardalis 212	1940	Camelopardalis 32 H.	14	12	47	50·664	1819·0
44	Camelopardalis 213	1977	...	3	13	10	57·530	1818·9
45	Ursæ Minoris 12	2006	...	19	13	20	13·481	1819·0
46	Camelopardalis 214	2007	...	3	13	22	29·927	1818·8
47	Camelopardalis 216	2037	...	2	13	36	44·900	1818·8
48	Camelopardalis 219	2063	...	1	13	48	0·920	1818·9
49	Ursæ Minoris 20	2099	...	2	14	10	13·200	1818·9
50	Camelopardalis 223	2196	...	4	15	3	13·888	1818·9
51	Ursæ Minoris 45	2210	...	4	15	6	8·235	1818·9
52	Ursæ Minoris 44	2213	...	1	15	10	59·360	1818·9

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No.	Struve's Name.	Gr. No.	Misc. Cat. and No.	No. of Obs.	Mean Right Ascension for 1820·0. h	m	s	Epoch.
53	1 π Ursæ Minoris (pr.)	2275	...	2	15	40	3·985	1819·4
53*a*	1 π Ursæ Minoris (sq.)	2276	...		15	40	16·765	1819·4
54	ϵ Ursæ Minoris	2422	...	70	17	4	46·175	1819·4
55	Cephei 4	2456	...	1	17	33	22·220	1818 8
56	Ursæ Minoris 79	2476	...	1	17	42	55·460	1819·0
57	δ Ursæ Minoris	2628	...	72	18	30	18 808	1819·3
58	24 Ursæ Minoris	2667	...	14	18	37	9·626	1818·8
59	prec. 75 Draconis	3268	Bradley 2701	2	20	37	45·315	1818·9
60	75 Draconis	3276	...	4	20	39	4·498	1818·9
61	74 Draconis	3277	...	2	20	39	26·350	1818·9
62	λ Ursæ Minoris	3308	...	14	20	37	26·841	1818·9
63	76 Draconis	3370	...	8	20	55	0·091	1818·9
64	Ursæ Minoris 86	3548	...	14	21	33	18·064	18 8·9
65	Cephei 180 prec.	3707	...	4	22	4	10·338	1818·9
66	Cephei 180 *a* seq.	3709	...	4	22	4	16 853	1818·9
67	Cephei 221 prec.	3820	Cephei 32 H.	1	22	26	10 480	1818 8
68	Cephei 221 *a* seq.	3824	Bradley 2997	1	22	26	48·360	1818·8
69	Cephei 233	3887	...	3	22	38	50·627	1818·8
70	Cephei 246	3928	Cephei 34 H.	1	22	47	54·780	1818·9
71	Cephei 253	3970	Cephei 36 H.	2	22	55	27·620	1818·8

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On the Probable Errors of Transit-observing.

By W. H. Finlay, M.A.

In the winter months consecutive transits above and below pole of several stars are often secured on the same night, and a question arises as to how the separate results for azimuthal error are to be combined to form the "adopted" azimuthal error. To settle this question we require to know the probable errors of observation at different declinations, and the following determination of the probable errors of a single wire in transit-observing was undertaken for this purpose.

After my results had been obtained I became aware of the formula given by M. Struve ("Sur l'Emploi de l'Instrument des Passages"), but as the latitude of the Cape is very different from that of Pulkowa I have thought it well to give my results.

The following is the method I have adopted :—

Assuming the adopted wire intervals to be absolutely correct, the difference of the observed interval between two wires from the computed interval gives the actual error made in measuring a distance by observation at two wires; so that by taking the mean of a large number of such differences we get the "average" error of a distance measured by transit over two wires. If M be this "average" error, or mean of the differences without regard to sign, then

$$\text{probable error of a distance} = M \times [9{\cdot}927046]$$

and

$$\text{probable error of a transit at one wire} = \frac{M}{\sqrt{2}} \times [9{\cdot}927046].$$

The differences for each star were multiplied by cos (declination) to reduce to the equator, and the stars were grouped in zones according to their North Polar distances. The observations which I have used were made with the transit-circle of the Royal Observatory, Cape of Good Hope, by the three observers who took the chief part in the observations for the Cape Catalogue, 1880; but the period which I found most convenient for my purpose was 1879–1881; the power of the eyepiece used was 180.

The following table gives the probable errors for different N.P.D.'s of an observation at one wire as observed, and also when reduced to their equivalents at the equator :—

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